Small Business Innovation Research/Small Business Tech Transfer

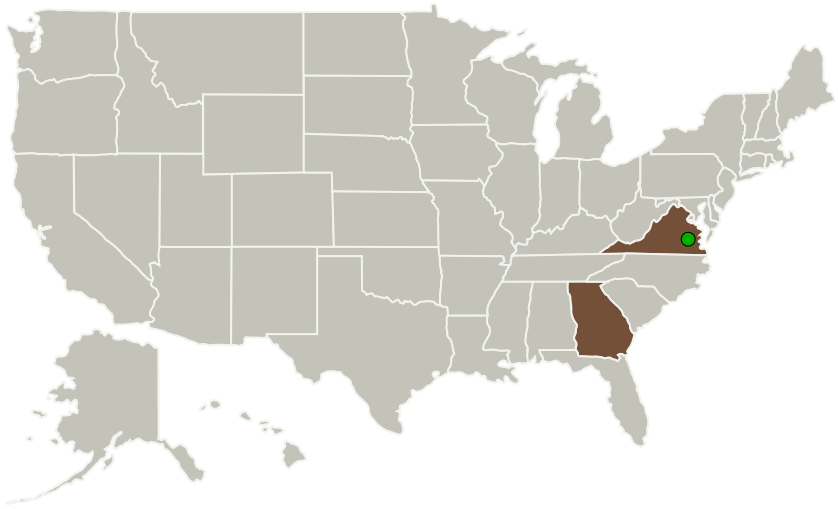
HeldenSurface: A CAD Tool to Generate High-Quality Surfaces, Phase I

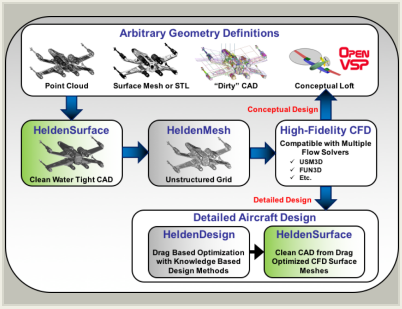
Completed Technology Project (2017 - 2017)

Project Introduction

One of the primary shortcomings identified during the NASA sponsored CFD Vision 2030 Study conducted during 2012-2014 was that the generation of meshes suitable for CFD simulations constitutes a principal bottleneck in the workflow process as it requires significant human intervention. CAD simplification and cleanup is one of the most user-intensive steps of the CFD mesh generation process and it is also one of the areas with the least amount of research taking place. The successful completion of this Phase I effort results in a validated method (HeldenSurface) for automatically converting arbitrary geometries (such as a cloud of points, "dirty" CAD, or CFD meshes) into a collection of watertight CAD surfaces that are smooth, connected, and split into as few number of surfaces as possible. This represents a critical capability needed to automate the CFD mesh generation process, which is the primary bottleneck in the application of CFD. The development of HeldenSurface would permit the thousands of engineers performing CFD to focus their energies on interpreting results instead of generating meshes.

Primary U.S. Work Locations and Key Partners





HeldenSurface: A CAD Tool to Generate High-Quality Surfaces, Phase I Briefing Chart Image

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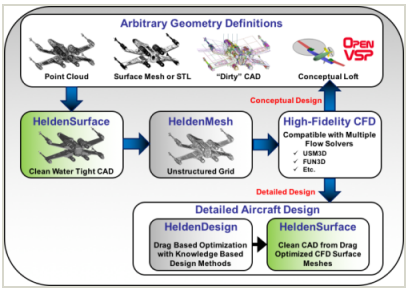
Organizations Performing Work	Role	Type	Location
Helden Aerospace Corporation	Lead Organization	Industry	Acworth, Georgia
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Georgia	Virginia

Images



Briefing Chart Image
HeldenSurface: A CAD Tool to Generate High-Quality Surfaces, Phase I Briefing Chart Image *(https://techport.nasa.gov/image/135079)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Helden Aerospace Corporation

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

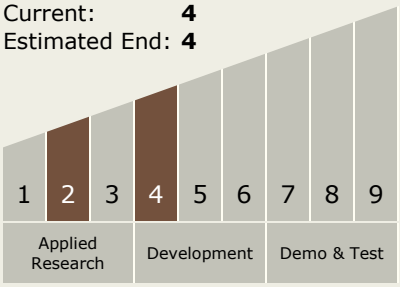
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
John Hooker

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX09 Entry, Descent, and Landing
  - TX09.4 Vehicle Systems
    - TX09.4.5 Modeling and Simulation for EDL